F 3448 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2010

Third Semester

Branch : Computer Science/Information Technology

SOLID STATE ELECTRONICS (RT)

(Regular/Improvement/Supplementary)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

Part A

Each question carries 4 *marks.*

1. What is thermal runaway ? How it is prevented in a high power transistor ?
2. What are the advantages of Darlington pair ? What are its limitations ?
3. Explain FET as an amplifier.
4. Explain the formation of inversion layer in MOSFET.
5. Explain briefly, what do you mean by an electronic oscillator ? Give two applications of an oscillator.
6. Why we need three RC networks for a phase-shift oscillator ? Can it be two or four ?
7. What is the purpose of a clamping circuit ?
8. With a neat sketch, explain the working of an astable multivibrator.
9. Explain the principle of operation of LED.
10. What are the advantages and disadvantages of an SCR switch over mechanical switch ?

(10 × 4 = 40 marks)

Part B

Answer **either** (a) **or** (b) *section of each module.*
Each full question carries 12 *marks.*

11. (a) Draw the output characteristics of a CE amplifier and explain, in detail the reason for the three different regions.

Or

(b) With the help of a suitable circuit diagram, explain the working of a RC coupled amplifier. Derive the expression for voltage gain of the amplifier.

12. (a) (i) Differentiate BJT and FET.

(ii) Derive an expression for pinch-off voltage for FET.

Or

(b) Write short notes on :

(i) Handling precautions for MOSFET.

(ii) Mode of operation of FET.

13. (a) What is Barkhausen Criterion of oscillation ? What are the practical considerations for getting oscillations ?

Or

(b) Determine the operating frequency of a transistor Hartley oscillator, if L_1 = 100 μH L_2 = 1 mH ; m = 20 μH and C = 20 pF.

14. (a) (i) Discuss the necessary criteria for a good differentiating circuit.

(ii) Enumerate the conditions under which an RC circuit behaves as an integrator.

Or

(b) Draw the circuit of an emitter coupled transistor monostable multivibrator and explain its operation. Show how this multivibrator can be modified to control the width of the output pulse.

15. (a) (i) Explain two transistor analogy of SCR.

(ii) Explain the construction and working of a DIAC.

Or

(b) (i) Why UJT is called a current controlled negative resistance device ?

(ii) Elaborate, with neat sketches the working principle of the two types of LCD.

(5 × 12 = 60 marks)

F 3456 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2010

Third Semester

Branch : Computer Science/Information Technology

PROBLEM SOLVING AND COMPUTER PROGRAMMING (R, T)

(Regular/Improvement/Supplementary)

Time : Three Hours Maximum : 100 Marks

Write neat and efficient C programs wherever necessary.

Part A

Answer **all** *questions.*
Each question carries 4 *marks.*

1. Distinguish between Top-down and Bottom-up approaches with examples.
2. Write an algorithm to determine the number of vowels in a given word.
3. List out the rules to be followed while declaring variables. Give valid and invalid examples.
4. Explain the precedence and associativity of arithmetic operators with examples.
5. Explain jumps in loops with an example.
6. Which are the two types f parameter passing used in functions ? Explain.
7. With syntax and suitable examples, explain the C declaration and initialization of 2 D arrays.
8. Distinguish between arrays, structures and unions.
9. Explain the I/O operation on a file using the standard library of C.
10. Write two different approaches to update a data file. Which one is better ? Why ?

(10 × 4 = 40 marks)

Part B

Answer **either** *Sections (a)* **or** *(b) of each module.*
Each full question carries 12 marks.

MODULE 1

11. (a) Explain modular, procedure-oriented and object orient programming methods. Compare and contrast them with reference to the programming approach and applications.

Or

(b) Write on algorithm to find the mean and standard deviation of *n* given numbers. Draw a neat flow-chart for the same.

(12 marks)

Turn over

MODULE 2

12. (a) Explain with suitable examples, the logical, relational, arithmetic and bitwise operators showing their precedence and associativity.

Or

(b) Write a C-program to generate all the three digit prime numbers. Also draw the flow chart for the same. (12 marks)

MODULE 3

13. (a) (i) What is recursion ? Explain with an example. (4 marks)

(ii) Write a function in C to accept 10 characters and to display whether each input character is a digit, or a lowercase alphabet or an upper-case alphabet ? (8 marks)

Or

(b) (i) Compare and contrast function and macro ? (4 marks)

(ii) Write a C program using "switch-case", for checking the corresponding colour for the input character and print the name of the colour, using case statements (Use R for Red, B for blue etc. Assume there are 7 possible colours). (8 marks)

MODULE 4

14. (a) (i) Bring out the meaning of array of structures. (4 marks)

(ii) Write a C program to read the following information of 120 students : Student name, roll number and marks in 8 subjects. Print the roll numbers and name of the students who have secured more than 60 % marks in total ? (8 marks)

Or

(b) Define a structure called "students" whose members are name, register number and average marks. Write a program to print the name of students of a particular branch who have passed and display the number of students passed in that branch. Also list the name and total number of students who have failed. Assume 50 % average marks considered as pass. (12 marks)

MODULE 5

15. (a) Write a program in C to perform file copy and file update. Assume a structure with data members author name, book title and price. Consider that the price of the book is to be updated.

Or

(b) Write a program in C to read a file and print it on the console 80 by 80 characters at a time. Write also a function to write it into another file with the same format. (12 marks)

[5 × 12 = 60 marks]

F 3471 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2010

Third Semester

Branch : Information Technology

DIGITAL ELECTRONICS (T)

(Regular/Improvement/Supplementary)

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 4 *marks.*

1. What are self complementing codes ? Explain with an example and its applications.
2. Simplify $f(a, b, c, d) = \Sigma m(0, 1, 2, 4, 5, 6, 8, 10, 14)$ using K-map.
3. Implement a half adder using basic logic gates.
4. What is a decoder ? Explain with neat circuit diagram, a BCD to decimal decoder ?
5. Define :
   (i) noise margin. (ii) propagation delay.
   (iii) fain-in. (iv) fan-out.
6. What is a totempole configuration ? Why it is used ?
7. Draw and explain a gated SR flip-flop using basic logic gates.
8. Explain the differences between truth table and excitation tables of JK flip-flop.
9. Distinguish clearly between synchronous sequential circuit and asynchronous sequential circuit.
10. Explain a mod-8 ripple up counter.

(10 × 4 = 40 marks)

Part B

Answer **either** *Section (a)* **or** *(b) from each module.*
Each full question carries 12 *marks.*

MODULE 1

11. (a) Using Quine Mc-Cluskey method, simplify the function $f(a, b, c, d) = \Sigma m(0, 2, 3, 4, 8, 10, 12, 13, 14)$ and realise the minimal circuit.

Or

Turn over

(b) Using K-map, find the minimal SOP and POS forms and realise the circuits using universal logic gates, for the function $f = \Sigma(2, 8, 9, 10-12) + \phi\Sigma(3, 6, 13-15)$. (12 marks)

MODULE 2

12. (a) Explain a 2-bit fast adder with equations for sum and carry bits. Compute the gate delay required for n-bit addition using serial adder and parallel adder.

Or

(b) With the help of truth table and circuit diagram, explain a 1-bit comparator. Obtain expression for an n-bit comparator outputs. (12 marks)

MODULE 3

13. (a) (i) Compare and contrast between standard TTL and Schottky TTL. (6 marks)

(ii) Explain ECL family with a logic gate. (6 marks)

Or

(b) (i) With a circuit diagram, explain the functioning of a CMOS NOR gate. (6 marks)

(ii) Sketch the voltage transfer characteristics of a two-input NAND gate using TTL and explain. (6 marks)

MODULE 4

14. (a) Write the function table and circuit diagram of a positive edge triggered D-flip-flop using NAND gates and explain its operation. (12 marks)

Or

(b) (i) With a neat diagram, explain the organisation of a ROM ? (6 marks)

(ii) Construct a 512 × 4 bit memory using two 256 × 4 bit ROM. Draw the connection diagram clearly. (6 marks)

MODULE 5

15. (a) What is a Universal shift register ? Design a 4-bit universal shift register for the function table given below :

Operation	*Select lines*	
hold	0	0
toggle	0	1
parallel load	1	0
shift right	1	1

(12 marks)

Or

(b) Design a synchronous counter to count the sequence

$0 \rightarrow 1 \rightarrow 3 \rightarrow 6 \rightarrow 5 \rightarrow 1 \rightarrow 0$.

(12 marks)

[5 × 12 = 60 marks]

(b) State and explain Norton's theorem. Using it, find the current in the 5Ω resistor shown in Fig. 8.

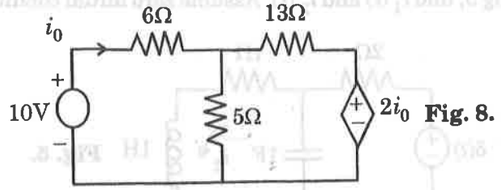


Fig. 8.

(12 marks)

MODULE 5

15. (a) (i) $F(s) = \dfrac{4s+13}{s^2+4s-5}$. Plot pole-zero diagram and examine the stability of the system.

(6 marks)

(ii) Find the transmission parameters of the network shown in Fig.9.

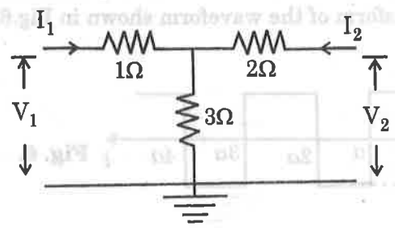


Fig. 9.

(6 marks)

Or

(b) (i) For the symmetrical lattice network shown in Fig.10, determine Z parameters and express Z_a and Z_b in terms of the Z parameters.

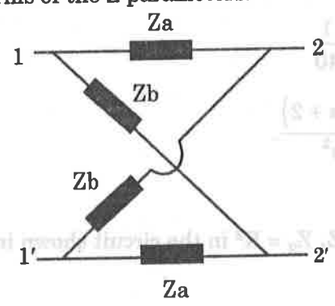


Fig. 10.

(6 marks)

(ii) Find the transmission parameters for the RC network shown in Fig.11.

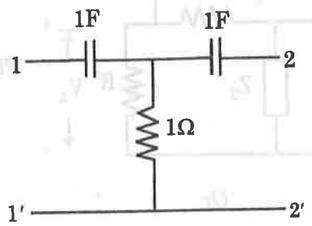


Fig. 11.

(6 marks)

[5 × 12 = 60 marks]

F 3442 (Pages : 4) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2010

Third Semester

Branch—Information Technology

ELECTRICAL CIRCUITS AND SYSTEMS (T)

(Regular/Improvement/Supplementary)

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions briefly.*
Each question carries 4 *marks.*

1. Obtain the transformed equivalents of inductance and capacitance, considering initial conditions.
2. What is duality ? How do you confirm if two networks are dual of each others ?
3. For the initially inert system shown in Fig.1, find the response $v_0(t)$.

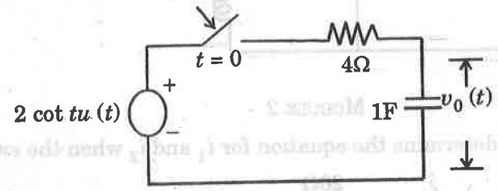


Fig.1.

4. Obtain the impulse response of a series RC circuit by differential equation method.
5. Find the Laplace Transform of $\left[\dfrac{1}{t}\sin wt\right]$.
6. What are the advantages of Laplace Transform method of solving systems compared to conventional methods ?
7. State and explain reciprocity theorem.
8. A coil of R = 3Ω, L = 1H is connected in parallel with a capacitance C = $\frac{1}{2}$F. Find the impedance function of the circuit.
9. Define hybrid parameters. Calculate $\dfrac{V_2}{V_1}$ for a two-port network terminated with z_L in terms of *h*-parameters.
10. Explain the significance of poles and zeros of system transfer function on the time domain response.

(10 × 4 = 40 marks)

Turn over

Part B

Answer **either** *Section (a)* **or** *(b) of each module.*
Each full question carries 12 *marks.*

Module 1

11. (a) Twelve identical wires of resistance 6Ω each arranged to form edges of a cube. A current of 40 mA is led into the cube at one corner and out at the most distant corner. Calculate the potential difference developed between the corners using Kirchhoff's laws and also the effective resistance of the network.

(12 marks)

Or

(b) Calculate the effective inductance of the circuit shown in Fig. 2., across AB.

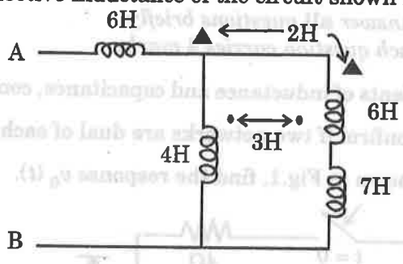


Fig. 2.

(12 marks)

Module 2

12. (a) In the circuit in Fig.3, determine the equation for i_1 and i_2 when the switch is closed at $t = 0$.

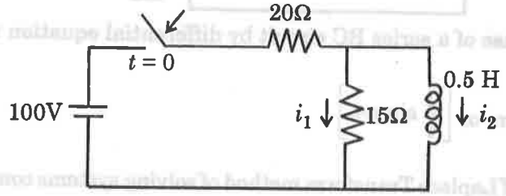


Fig. 3.

(12 marks)

Or

(b) In the network shown in Fig.4, find $i_2(t)$ for $t > 0$, if $i_1(0) = 5A$.

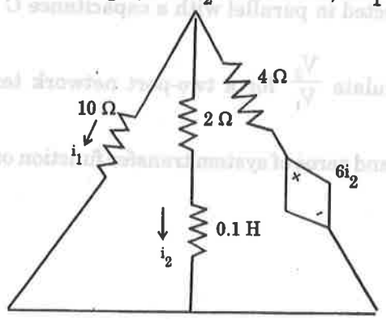


Fig. 4.

(12 marks)

Module 3

13. (a) In the circuit of Fig 5, find $i_1(t)$ and $i_2(t)$. Assume zero initial condition. Use Laplace Transform method.

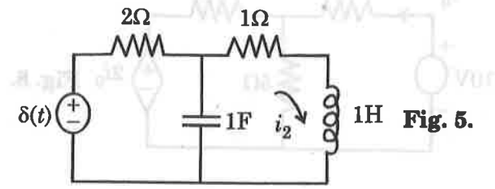


Fig. 5.

(12 marks)

Or

(b) (i) Determine the final value of the function $f(t) = 3u(t) + 2e^{-t}$ using final value theorem.

(6 marks)

(ii) Find the Laplace Transform of the waveform shown in Fig.6.

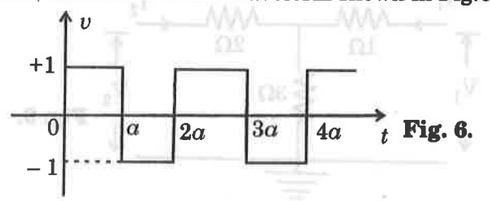


Fig. 6.

(6 marks)

Module 4

14. (a) (i) With relevant explanation, state whether the following represent driving point impedance functions.

1 $z_1(s) = \dfrac{4s^4 + s^2 - 2s - 1}{s^3 + 2s^2 + 2s + 40}$

2 $z_2(s) = \dfrac{15\left(s^3 + 2s^2 + 3s + 2\right)}{s^4 + 6s^3 + 8s^2}$.

(6 marks)

(ii) Show that $\dfrac{V_2}{V_1} = \dfrac{1}{1 + \dfrac{Z_1}{R}}$ if $Z_1 Z_2 = R^2$ in the circuit shown in Fig.7.

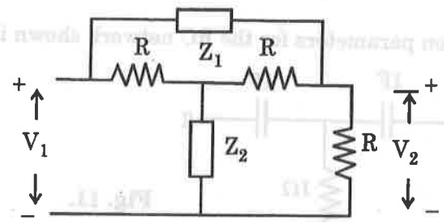


Fig.7.

(6 marks)

Or

Turn over

F 3463 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2010

Third Semester

Branch : Computer Science, Information Technology

HUMANITIES (R, T)

(Regular/Improvement/Supplementary)

Time : Three Hours Maximum : 100 Marks

Answer Part A and Part B in **separate** *answer-books.*
Part A and Part B each carries 50 marks.
All full questions carry equal marks.

Part A (Principles of Management)

Answer **either** *Section (a)* **or** *(b) of each module.*

MODULE 1

1. (a) (i) Explain the organisational structure of a government department.

(ii) What are the advantages of line and staff organisation ? Discuss the functional relationship.

Or

(b) (i) Define scientific management and explain the functions of management.

(ii) Explain the different methods of job evaluation.

MODULE 2

2. (a) (i) Describe the procedure of ISI certification.

(ii) Explain the role of leadership in TQM.

Or

(b) (i) Explain the various steps in quality improvement.

(ii) What is Big "Q" concept of quality ? What is the importance of feedback in this approach.

Part B (Engineering Economics)

Answer **either** *Section (a)* **or** *(b) of each module.*

MODULE 3

13. (a) (i) What are the functions of nationalised commercial banks in a mixed economy ?

(ii) Explain the methods by which the central bank controls the volume and creation of credit.

Or

(b) (i) Explain how SIDBI functions as a financial system.

(ii) Describe the functions of reserve bank with reference to economic development of a country.

Turn over

MODULE 4

14. (a) (i) Discuss the favourable factors existing in India for the industrialisation, after independence.

(ii) Explain the policy of the Government of India towards industrial sickness.

Or

(b) (i) Explain the problems of unorganized labour in Indian industries.

(ii) Explain the revolutionary changes happening in the industrial policy of the Government of India in recent years.

MODULE 5

15. (a) (i) What are the factors on which incidence of tax depends ? Trace the incidence of estate duty and inheritance tax.

(ii) Outline a tax policy designed to promote the economic development of an under-developed country.

Or

(b) (i) Discuss the effects of public debt on (1) money supply ; (2) price level and (3) rate of interest.

(ii) What is fiscal policy ? Examine its objectives with reference to a developing economy.

F 3435 **(Pages : 3)** **Reg. No.....IT.....**

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2010

Third Semester

Branch—Computer Science/Information Technology

ENGINEERING MATHEMATICS—II (R, T)

(Regular/Improvement/Supplementary)

Time : Three Hours **Maximum : 100 Marks**

Answer **one** *full question from each module.*
All questions carry equal marks.

Module 1

1. (a) Rewrite each of the following expressions using A and N instead of $\wedge$ and $\sim$:

   (i) $p \wedge \sim q$

   (ii) $\sim(\sim p \wedge q)$

   (iii) $\sim p \wedge (\sim q \wedge r)$.

   (b) Determine the truth value of each of the following statements :

   (i) It is false that $2 + 2 = 4$ and $1 + 1 = 5$.

   (ii) It is false that $2 + 2 = 4$ or London is in France.

Or

(c) Verify that the proposition $p \quad \sim(p \wedge q)$ is a tautology.

(d) Let A = {1, 2, 3, 4, 5}. Determine the truth value of each of the following statements and also negate each of the statements :

(i) $(\exists\, x \in A)\ (x + 3 = 10)$.

(ii) $(\exists\, x \in A)\ (x + 3 < 5)$.

(iii) $(\forall x \in A)\ (x + 3 < 10)$.

(iv) $(\forall x \in A)\ (x + 3 \leq 7)$.

Module 2

2. (a) Let S = $\{n / n \in N$ and $n > 1\}$ If $a, b \in s$ define $a \sim b$ to mean that a and b have the same number of positive prime factors (distinct or identical). Show that ~ is an equivalence relation.

(b) Let T be the set of triangles in the Euclidean plane. Show that the relation R of similarity is an equivalence relation on T.

Or

(c) Suppose $f : A \to B$ and $g : B \to C$ are onto functions. show that $g \circ f : A \to C$ is an onto function.

(d) Let R be a binary relation. Let $S = \{(a, b) | (a, c) \in R$ and $(c, b) \in R$ for some C}. Show that if R is an equivalence relation, the S is also an equivalence relation.

Module 3

3. (a) Let A = {2, 3, 6, 8, 9, 18} is ordered by divisibility. Identify the linearly ordered subsets of A with three or more elements.

(b) Write the dual of each statements :

(i) $(a \wedge b) \vee c = (b \vee c) \wedge (c \vee a)$

(ii) $(a \wedge b) \vee a = a \wedge (b \vee a)$.

Or

(c) Show that the positive integers N is a lattice with respect to the operations :

(i) $a \vee b = lcm\ (a, b)$

(ii) $a \wedge b = \gcd\ (a, b)$.

Module 4

4. (a) Obtain the discrete numeric function corresponding to the generating function :

$$A(z) = \frac{1 + z^2}{4 - 4z - z^2}.$$

(b) Find the particular solution for the difference equation $a_r + a_{r-1} = 3r\ 2^r$.

Or

(c) Find the simple expression for the generating function of each of the following discrete numeric functions :

(i) 1, 1, 2, 2, 3, 3, 4, 4, ...

(ii) 1, – 2, 3, – 4, 5, – 6, ...

Module 5

5. (a) Determine whether or not each of the following multigraphs G(V, E) is a graph where V = {A, B, C, D} and :

(i) E = [{A, B}, {A, C}, {A, D}, {B, C}, {C, D}]

(ii) E = [{A, B}, {B, B}, {A, D}]

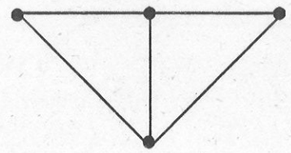
(iii) E = [{A, B}, {C, D}, {A, B}, {B, D}]

(iv) E = [{A, B}, {B, C}, {C, B}, {B, B}]

(b) Find the connected components of G where V(G) = {A, B, C, P, Q} and E(G) = [{A, C}, {B, Q}, {P, C}, {Q, A}].

Or

(c) Find all t he spanning trees of the graph shown in figure below :



(5 × 20 = 100 marks)